PERSONAL DIFFERENCES IN SUGGESTIBILITY.

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Discussions upon suggestion and suggestibility ordinarily seem much influenced by the older concepts taken from 'faculty' psychology. In that former time observation, for instance, was assumed to be an unanalyzable and elementary faculty. One person might possess a good power of observation and another a poor one. Individuals of a group could be given some single test and thus classified and given rank as to their power of observation in general. To-day we speak of suggestibility in an analogous fashion. This manner of thought is not confined at all to the laity but finds explicit expression in most of the recent technical discussions of the subject. The statements are made without reservation that children are more suggestible than adults; that girls are more suggestible than boys; that some nations are more suggestible than others; that neurasthenics, psychasthenics and hystericals are peculiarly suggestible; and finally that any particular group of individuals could be definitely ranked according to the degree of their suggestibility.

In an attempt to determine to what extent suggestion is a general faculty and therefore to what extent individuals could be ranked as to the degree of their suggestibility, a single group of individuals has been tested by various methods. The results secured by the different methods were then correlated by the well-known Pearson's formulæ for the coefficient of correlation.

For the most part the methods employed were taken directly from the literature describing methods for testing suggestibility and need no further comment. Two of the methods or devices, however, were, at least in part, new and seem especially well adapted for testing suggestibility.

The first method was one for controlling by suggestion the

sequence of colors in the visual after-image secured from fixating white light.

The subjects were college students who were just beginning their first course in experimental psychology. Many of them were at the time experimenting upon negative after-images for colored papers.

For the experiment upon suggestion each student was taken singly into the room specially prepared to increase the suggestibility for the particular experiment. A mounted spectral chart was demonstrated and the spectral order of the colors committed by the student. The Bradley disk, composed of six sectors, each of a single spectral color, arranged in order, was placed on the color wheel and revolved till a pure gray was secured. A prism was used to separate the rays of white light into the several spectral colors. The student was then instructed that just as the prism analyzed the white light into the spectral colors so an after-image from white light would contain the spectral colors in sequence. He was told that the experimenter was securing data as to the exact time various subjects required for observing in sequence the various spectral colors as they develop in the after-image.

The experimenter sat before a kymograph with a time marker which marked seconds on the smoked paper. The light necessary for his work was not sufficient to add greatly to the general illumination of the otherwise dark room.

The white light for fixation was secured by means of an opening in a screen twelve centimeters square. The subject sat three meters from the screen and by raising his eyes about thirty degrees he looked through the opening and directly into the white skylight.

The subject fixated this white skylight for twenty seconds, then closed his eyes and had them further screened by several thicknesses of black velvet.

At the conclusion of the fixation the experimenter began at once to increase the previous suggestions by such questions as the following: Let me know as soon as the red appears. Report the red as soon as it comes. Is it red yet? Now is it red?, etc. These questions were continued for 20 seconds or until red was

reported, when the same questions were asked for orange, yellow, and so on through the spectral order.

The subject was of course instructed to report whatever colors he saw and to report them the first moment possible. The experimenter recorded on the revolving drum the color reported and the time of the report.

After the subject's eyes had fully recovered from the effect of the after-image, a second and a third trial was made.

In some instances the after-image lasted several minutes but occasionally it would fade before 30 seconds succeeding the first appearance of any color. For this reason we considered only the colors reported for the 20 seconds succeeding the first report of the presence of any color in the after-image.

With conditions such as those under which we worked the normal sequence of the after-image is first a blue, then a green, then red and then finally a blue. The colors are very brilliant and beautiful. The red ordinarily does not appear during the first 20 seconds. Therefore that red which is reported during the first 20 seconds is recorded as due to suggestion. Apart from suggestion an orange would certainly not succeed a red during the first 20 seconds. Any advance in the spectral order beyond red during this first 20 seconds is unmistakably due to suggestion.[1]

Adding together the first 20 seconds in each of the three trials we get a total of 60 seconds in which the effect of suggestion was being measured. One subject reported as follows: First trial — red, orange, yellow, green, blue and violet; second trial — red, orange, yellow and green; third trial — red, orange, yellow, green, blue and violet. This is a total of 16 suggested colors in 60 seconds. The colors reported were not indistinct but vivid and beautiful. In no way did he suspect that the colors were due to suggestion. As a control at a later time we changed the conditions but not in any essential particular except that we instructed the subject that with the new conditions the spectral order would not be secured. In three trials he reported

[1] No adequate data are available indicating the manner in which the sequence of the colors of the after-images for white light is varied by changes in illumination, time of fixation, etc. The writer contemplates the securing of such data.

the normal sequence, with certain variations as is common to this experiment. We estimated the results of his last trials, namely, those without suggestion, upon the same basis as was used in securing his previous record of 16, and his new record was 1. In one of the three trials the red appeared before the limit of 20 seconds. In no case, however, in the control experiments, did an orange succeed a red.

Of the twenty students tested 3 reported no color due to suggestion and the others ranged from 1 to 16 as is indicated in the following table.

Subject.	No of Suggested Colors Reported.	Rank in Group of 20	Times Suggested Heat was Reported	Rank in Group of 20.
A	16	1	10	5
B	10	2	10	5
C	7	4	9	12
D	7	4	8	15
E	7	4	10	5
F	6	7	9	12
G	6	7	4	18
H	6	7	5	17
I	5	9	10	5
J	3	11½	3	20
K	3	11½	10	5
L	3	11½	10	5
M	3	11½	4	19
N	2	15	9	12
O	2	15	10	5
P	2	15	10	5
Q	1	17	10	5
R	0	19	7	16
S	0	19	9	12
T	0	19	9	12

The same 20 students acted as subjects in an experiment upon the production by suggestion of illusions of heat.

An electric current of 110 volts, direct current, was sent through a bank of lamps and then through a naked wire of high resistance coiled about a lead pencil. The strength of the current passing through the coil was so adjusted that a subject could detect the change of temperature in from 5 to 10 seconds. The lamps were placed on the center of an ordinary sized table and the naked coil was supported a few inches above the table and near its edge. A subject could then sit at the table facing the lamp and grasping the naked coil with two fingers and a thumb. In this position the light of the lamps in the otherwise dimly

lighted room flashed brightly in his face. The heat from the lamps could be slightly felt on the face but was shielded from the coil and the hand grasping it.

The subject was instructed that the experiment was to secure the lower threshold for temperature and that 20 readings would be necessary. He was shown how the current which heated the lamp passed through the naked coil heating it also. He was shown how the wire would gradually increase in temperature till it became appreciably heated. He was told that he was to hold the wire in a particular way and to report the fact as soon as the temperature of the wire appreciably changed.

The procedure of the experiment was well stereotyped. After a warning the signal was given. The stop watch was then started, the electric switch closed, the subject grasped the naked coil and the lamps were lighted. The experimenter then kept one hand on the switch and the other on the stop watch in an attitude of strained attention. At the signal, 'now' from the subject the watch was stopped, the switch opened, the subject removed his hand from the coil and the lamps went out. This was repeated for 10 trials. From the eleventh to the twentieth trial nothing was changed except that the experimenter touched a concealed switch with his knee which shunted the current off completely from the naked coil without in any way reducing the amount of current passing through the lamps. Even when no heat was thus generated in the coil the subject might continue to report the presence of the heat just as regularly as during the first 10 trials.

The experimenter made a rough estimate of the average time for the first 10 trials, and then during the latter 10 trials if the subject failed to report the presence of heat within a time 5 seconds in excess of his previous average, the experimenter removed his knee from the concealed switch and sent the current through the coil. For instance, if during the first 10 trials the subject had reported heat on the average at 7 seconds, then if during one of the latter trials he had not reported heat by the twelfth second, the heat would be sent through the coil, so that ultimately the heat would actually be felt and no suspicion aroused.

As would naturally be expected, some of the subjects re-

ported heat as regularly during the trials from number eleven to twenty as from number one to ten. Some even gradually shortened the time for the second half of the series. Others failed to report heat except when it was actually being generated by the current. Some reported heat occasionally when none was present.

This experiment with heat has many points of similarity with the previous experiment with after-images. Both are concerned with sense-suggestion. In each an attempt is made to change one sensation into another by means of suggestions. In the first an attempt is made to change the normal blue of the after-image to a suggested red and then to other suggested colors. In the latter experiment an attempt is made to change by suggestion a perception or sensation of touch into one of heat. In each the experimenter employs his personality in securing expectant attention through instruction as to what is to be expected. The subjects were experimented upon singly. The time marker in the first and the stop watch in the second set of experiments prompts to hasty reports. Indirect factors enter into each. The sight of the analysis of white light into the spectral colors in the one and the warmth reaching the face from the lamps in the outer are the most significant indirect factors in rendering the suggestions effective. In both experiments the suggested results are fully expected. This was shown by the introspection of the subjects which was secured in each instance. No suspicion was indicated in any of the reported introspections.

The conditions surrounding the experimentation and the psychological factors experimented upon seemed so similar in the two experiments that a fair degree of correlation was anticipated. When, however, the coefficient of correlation was secured from the two sets of data presented in the table on page 150 it proved to be insignificant.

The most natural interpretation of this result is that the suggestibility tested by the one experiment was different from that tested by the other.

Among the psychological factors which differ in the two sets of experiments a few are apparent. Suggestibility in the first case may be dependent upon strength of visual imagery, and

in the second case upon strength of imagery for temperature. If such is the case, then to secure tests upon suggestibility and not upon the relative strength of imagery the experiments would have to be so changed that the demand would be made upon imagery of the same sensorial type, and only those subjects might be included in the group who had relatively equal degrees of strength of this type of imagery.

But perhaps the factor most effective in reducing the coefficient of correlation secured for these two tests lies in the source of the expectancy. In the experiments upon after-images the expectancy was based mainly on the word of the experimenter. The working of the prism and of the color wheel may have been, in some instances at least, negligible factors. In the experiment with heat the word of the experimenter may have been negligible while the experience secured in the first 10 trials with heat may have been, in some instances at least, the sufficient ground for the expectancy. The experiment with after-images may then have been a test of hetero-suggestibility, while the experiment with heat may have been an experiment upon auto-suggestibility. To eliminate this psychological difference in the form of suggestibility being tested it would be necessary to increase the hetero-suggestion in the one or to reduce it in the other. The auto-suggestion in the first could be increased by so modifying the experiment that the subject would have his expectancy aroused by his previous experience. To secure this the subject could be informed that the sequence of the colors in the after-image is blue, green, red and blue. He could then be led to observe the after-images on ten bright days in which the actual order of sequence of the colors of the after-image would be according to his instructions. On his eleventh trial he would expect the same order even though the sky were less bright and therefore another order would normally result. If however he was instructed that the order, blue, green, red and blue was universally secured, and if in addition he had secured that order in ten trials his expectancy would be at least similar to that awakened for the heated wire upon the eleventh trial. In each case the words of the experimenter are corroborated by ten or more instances from the past experience of the subject.

There may be still other psychological factors in addition to differences in imagery and differences in susceptibility to hetero-suggestions and to auto-suggestions which had a part in lowering the coefficient of correlation.

At all events the inference from a study of these two experiments (and others not here described) is that degrees of suggestibility as determined from one test cannot be inferred as holding for suggestibility in general. Before individual *A* can be said to be more suggestible than individual *B* they must have been subjected to many and diverse forms of tests. Otherwise different degrees of suggestibility should be affirmed as present only for the particular form or forms as tested.

Suggestion, like observation, is a general term embracing many psychological processes. We have ceased to speak of people as possessing great powers of observation and instead we specify the particulars in which the power of observation has been shown to be especially good. In studying the personal differences in suggestibility we must adopt a form of expression analogous to the newer forms used in discussing observation. Instead of speaking of high and low degrees of suggestibility in general we are forced to specify the particular in which the degree of suggestibility has been observed.